

Dobson Cellular Systems

July 12, 2001

Dobson Cellular Systems/ American Cellular Corporation

TTY Report

Dobson Cellular Systems (DCS) and American Cellular Corporation (ACC) have met with their switch vendors over the past couple months. One vendor has said that their next feature will provide vocoder enhancements to support TTY signaling transmission over TDMA channels. It will also support VCO/HCO and is completely passive. No interaction on the part of the user nor on any other parts of the wireless network beyond the vocoder.

DCS/ACC is waiting on the availability of the switch features. We expect to do field trials within the next three months. Since our last report, we have not had much interaction with the TTY Forum. We are still committed to have the ability to transmit 911 calls thru the use of TTY by December 01 and fully capable of this by June 02.

Sincerely,

Sean O'Hara

Special Project Coordinator

Dobson Cellular Systems

ERICSSON INC.
TTY Forum #18 Report
July 11, 2001

This report details the verbal presentation provided by Ericsson at the June 06, 2001 TTY Forum 18. The attached report identifies standards status, project status, technical design issues, test status, delivery planning information and contact information.

Ericsson continues to develop and test products that incorporate TTY technology. The process of integrating this technology requires a tremendous amount of system integration development, performance testing, and technical problem identification and resolution. Ericsson continues to work these technical problems, to clarify, document, identify actions, and implement solutions. Ericsson also continues to monitor Standards Organizations, ATIS Incubator, and the Industry to determine what involvement and communications are required. Ericsson has been working closely with other manufactures, test labs, and development teams to ensure product deliverables are met.

Risks:

At the TTY Forum 18 several manufacturers pointed out risks and concerns with respect to meeting the compliance requirements by the FCC. Ericsson has currently put a process in place, to assess and elevate any technical issue, which proves to be a valid problem, stemming from the integration of TTY technology into its products. Currently, Ericsson is working several issues through the industry, that have been identified as risks or technical concerns in the development of digital TTY compatibility. Several of these items have been in the resolution process since TTY Forum Meeting 17. These items include audio quality, and echo concerns as reported from the test labs.

The audio quality concerns are in the earliest stages of evaluation, and studies of the user equipment configuration and digital cellular transport behavior have yet to be fully characterized. Complete assessment and early resolution of this concern is needed to meet the mandate. Ericsson is monitoring the test data and changes proposed for self-echo, reported network echo, and echo suppressor errors. Currently Ericsson is actively participating in the ATIS Incubator process, and contributing technical guidance required to isolate, identify and resolve the issues raised.

Critical Work Status:

Several "critical work items" have been in a review process since TTY Forum Meeting 17. These items include the user intervention, TTY mode switch, and changes in TTY ballot standards.

The acceptance of user intervention, and the TTY switch, in the user interface, has alleviated a significant concern for the wireless industry. Ericsson continues to monitor the status of the TTY ballot standards, and provides contributions to those committees. Currently there are reported behavior anomalies in TTY signaling when the new circuits and software are placed within the digital cellular system. These anomalies have generated several ballot comments, which may result in multiple changes to the defined standards. Although it is evident that these

changes to the early code are required, it may also be necessary to make additional changes to accommodate technical issues stemming from system integration. For products that have completed the TTY development process significant schedule risk is incurred subsequent to each change of the balloted standard. Ericsson allocates resources when standards changes occur, to maintain schedule. Each change in TTY standards imposes a risk to the product schedule.

Ericsson believes it is in the best interest of the industry to focus on acquiring a complete list of changes needed before committing to an alternate release of the standard.

At TTY Forum 18, additional user intervention guidelines were also proposed with respect to the mode switch. Ericsson is reviewing these guidelines and is preparing a response to the Forum.

The 3GPP SA2 standards group proposed a new solution for TTY in GSM, CTM Circuit Pooling. Ericsson together with Nortel and Nokia were actively involved in drafting the standards proposals. A joint statement was presented showing Ericsson, Nortel and Nokia's endorsement of the new solution. Ericsson participated in developing a white paper that describes these changes within the ATIS Incubator group, which outline the required changes. In this solution the CTM mobile indicates to the network an interest for CTM support, and the network allocates network resources for the call.

Terminal Status:

Ericsson terminal products have progressed through the "prototype development stage" and are entering the final stages of "product test stage". The prototype build plan and initial software development are complete for all product technologies. Full system activation and test data is now being generated for CDMA, TDMA, and GSM products. Handset testing plans are in place, and test scenarios are being performed. The planning of and scheduling of product development has been completed.

Prototype testing of units for GSM is scheduled to be complete by week 28; TDMA test units are scheduled to begin week 30; and CDMA units were completed in week 26. The build and system interoperability test plans are in place. FOA partners for test have been identified for the products, as final plans are under way for the release of product compliant technologies by the FCC mandate.

Test activities are planned to include operation within Ericsson networks, Interoperability tests, and other test scenarios.

Prototype analog terminal products are being tested as a benchmark reference. Early tests of these products generated abnormal test results in the presence of echo suppressors. The product impact is being assessed. The test results have been submitted to the ATIS Incubator for further work activity.

GSM products completed the development test phase on week 26, and are entering the system test phase. Deliveries of the second build of the CTM accessory and GSM terminal is scheduled for week 28. GSM mobiles will be modified to include the CTM BIT per the new 3GPP SA2 requirements.

Terminal Plans:

Currently integrated TTY terminals are planned for CDMA, and TDMA models. Integrated CDMA and TDMA models will be generally available (GA) by December 31, 2001. GSM terminal products will employ a CTM adapter for GA date of December 31, 2001.

Network:

Ericsson has completed development planning of network projects within the company to integrate TTY technology within its product line of network base station products. The design activities are progressing for TDMA CDMA and GSM technologies. The activation of prototypes is underway for TDMA and GSM products. The assessment of transcoder performance, with the incorporation of TTY technology, is in process. Actual performance simulation and prediction will be documented for early field planning and customer information.

TDMA Status:

TDMA transcoder development software testing started in June, and prototype testing is currently being conducted at Montreal and Raleigh facilities. Initial tests show TDMA network products operational and generating positive test data Ericsson has implemented the approved-balloted versions of standard for each of the technologies. In addition, Ericsson has implemented the March 19th 2001 version of IS-823A, which includes many of the changes from the first quarter of this year. Particularly, the TDMA transcoder (IS823-A) solutions consists of TIA/EIA PN3-4614-RV1, 03/19/01 ballot version, and TIA/EIA PN3-4721-RV1 (IS-840), 03-19-01 ballot version with header fix.

C DMA Status:

CDMA transcoder software is currently in development.

GSM Status:

Development activities are ongoing for the Circuit in Pool solution. The GSM solution development testing started in June 2001, and expects to complete by end of July 2001

TDMA Plans:

Ericsson is in the test planning stage for TDMA network technologies. The TDMA FOA is scheduled for August 2001. The GA for TDMA network is planned for September 15, 2001. TDMA Network software ordering information may be obtained from the customer KAM interface.

CDMA Plans:

The CDMA FOA is planned for November 2001. The CDMA GA is expected to be January 2002.

GSM Plans:

The current beta test and lab testing schedule for GSM is to have CTM Circuit Pool Solution FOA on October 2001. Ordering information for GSM Network software and hardware may be requested from Magnus Wollman. Volume delivery is expected to start December 27, 2001.

PSAP Test Activities:

Ericsson has participated in drafting proposed test methodologies, and is working to solidify testing plans in conjunction with the ATIS Incubator. Initial contacts and planning have started in the incubator, and involvement of TRS, E-911 centers, and end users has been discussed.

Ericsson has proposed test cases to the industry and continues to participate in the definition of the test cases.

Carrier Testing Activities

Ericsson has completed discussions to be involved in the carrier-testing phase and plans to make product improvements and monitor validation testing as testing progresses.

Joint GSM Statement

The statement that Nortel, Nokia and Ericsson have agreed upon is attached.



"Common Statement
on Circuit Pooling.doc

Please feel free to contact either Matt Kaltenbach or Steve Coston if you have any question regarding the supplied information, or wish to contact internal test or product interfaces. Please contact your local customer interface for product sales and marketing information.

Farmers Cellular Telephone, Inc.
TTY Report
July 3, 2001

- Network infrastructure software/hardware development and testing

Farmers Cellular Telephone, Inc.'s ("Farmers Cellular's") network consists of only one Nortel switch. We offer analog service as well as TDMA digital. Farmers Cellular has purchased the latest software upgrade from Nortel. Nortel Networks' development is complete, and product tests have been completed as well. Nortel tested with Panasonic prototypes. (Other handset vendors were not available during Nortel's NBSS10.1 test cycle).

- Handset development and testing plans

Farmers Cellular handset vendor status: Ericsson is on schedule. Motorola has not given an update, and Nokia is on schedule.

- Schedule for deployment of the software/hardware in the Farmers Cellular switches

The minimum baseline software requirement for this feature to be deployed in Farmers Cellular switches is MTX09 or higher. On the BSCs, the baseline requirement is NBSS 10.1 or higher. Software is scheduled to be available Week 44 and will be scheduled for deployment on specific Farmers Cellular switches on a market-by-market basis.

- Beta testing and lab testing

Turbocode/ HiSpeed is a proprietary feature on Ultratec/Ameriphone TTY device and is not supported by TDMA standards. If TDMA standards are enhanced to support these devices, Nortel will support this in a future release. However, standards are designed to avoid supporting propriety methods and there is no known effort to standardize the propriety features.

- Release and general availability to carriers of network infrastructure software

Under Nortel's recommendation, Farmers Cellular will engage the chosen TDMA TTY handset vendor during network testing to do interoperability testing with the Nortel Networks solution.

- Plans to test with the Public Safety Community (PSAP's)

Farmers Cellular will schedule this testing with the PSAP centers during its network testing. Farmers Cellular will work with Nortel to identify PSAPs that would be willing to test an end-to-end solution.

- Carrier Testing activities

Testing will begin upon receipt of software.

- **Retail Availability**

Farmers Cellular is dependent upon the availability of handsets from vendors.

- **Geographic scope of network infrastructure deployment**

Farmers Cellular will test the four PSAPs in our geographic area when the software is available.

Farmers Cellular remains committed to meeting the FCC's tentative mandate to provide E911 TTY access to our network. The software to support IS-823 has been delayed, but Nortel's newly-scheduled release date should still allow compliance. Nortel will not support 50-baud TTY for their first release.

Great Lakes of Iowa inc
TTY REPORT
JULY 9, 2001

I. **Network infrastructure software development**

Great Lakes of Iowa inc utilizes Nortel Networks switch to provide digital wireless services in certain areas throughout its market. **Great Lakes of Iowa inc** understands that Nortel Networks has completed its development of software and product tests (see letter from Nortel submitted in the April quarterly report of the TTY Forum ("Nortel Letter"))).

II. **Handset development and testing plans**

Great Lakes of Iowa inc must rely on handset vendors to develop the required handsets. When handsets are available, testing can be performed with area PSAPs to insure compatibility.

III. **Beta testing and lab testing**

Great Lakes of Iowa inc must rely on Nortel Networks and handset vendors for initial conformance testing.

IV. **Release and general availability to carriers of network infrastructure software**

Great Lakes of Iowa inc understands that Nortel Networks' enabling software load, MTX10, is scheduled for General Availability Week 44, 2001 (see Nortel Letter).

V. **Availability to carriers to full acceptance test units**

Great Lakes of Iowa inc understands that Nortel Networks plans to test and confirm the solution performance.

VI. **Efforts toward achieving digital wireless solution capability with enhanced TTY devices**

Great Lakes of Iowa inc understands that the solution provided by the MTX10 software load addresses Baudot type messages only. Other capabilities may be included later, after standards are adopted.

VII. **Carrier coordination of testing with PSAP**

See response to item 2. above.

VIII. **Carrier testing activities, including field testing, consumer end-to-end testing, and other necessary tests**

Great Lakes of Iowa inc will begin testing activities when the correct software load is installed in the switch and handsets are generally available.

IX. **Retail availability of necessary consumer equipment.**

It is unknown when handsets will be available.

X. **Geographic scope of network infrastructure deployment**

Great Lakes of Iowa inc understands that the MTX10 software is the only requirement for implementation. The company has not been informed of any required hardware changes.

Respectfully Submitted,

Mike Mitchell
CEO



REPORT TO TTY/TDD FORUM 18

Lucent Technologies

12 June, 2001

Chris Fernandez - Product Management
Steve Benno - Algorithm Development
Jim Huntley - Lab Testing

TTY/TDD Standards

Lucent Technologies
Bell Labs innovations



TTY Standards updated with latest fixes.

TR45.5/3GPP2 CDMA Standards

- IS-127-3 EVRC TTY Extension Balloted
- IS-733-2 13K TTY Extension Balloted
- SMV Contains TTY/TDD Extension.

TR45.3 TDMA Standards

- IS-823-A TTY for TDMA Balloted
- IS-840-A TTY Min Perf Spec Balloted

LAB TESTING OF TTY/TDD - TDMA

Lucent Technologies
Bell Labs Innovations



Test Categories:

- 1) **Baseline Testing** - unimpaired TTY transmission performance for live & streaming uplink, downlink & mobile-to-mobile calls with Power Control (DTX/DDPC) ON & OFF.
- 2) **HO Testing** - unimpaired TTY transmission performance for live & streaming, uplink & downlink calls with Power Control (DTX/DDPC) ON & OFF under hand-off.
- 3) **Impairments Testing** - TTY transmission performance for live & streaming, uplink & downlink calls with Power Control (DTX/DDPC) ON & OFF with Noise + Fading on RF link.
- 4) **Interoperability Testing** - unimpaired TTY transmission performance for live & streaming, uplink & downlink calls with Power Control (DTX/DDPC) ON & OFF with TTY OFF at mobile.
- 5) **False Alarm Testing** - unimpaired and impaired TTY transmission performance for streaming uplink & downlink calls with Power Control (DTX/DDPC) ON.

Test Results: (Ultratec Compact TTY - Ameriphone Q90)

- 1) Downlink CER ~ 0%; Uplink CER ~ 0-1+%; Streaming CER → 0%; Live CER → 1%;
There are still known Uplink problems with the TTY mobiles .
- 2) Downlink better than Uplink (75 vs .125 ms mute times); HO CERs a little worse than expected; TTY mode errors may occur.
- 3) Faded CERs ~ same as Baseline Tests. Fading + Noise CER Uplink ~0-1% at C/I = 12 dB; Fading + Noise Downlink CERs vs. C/I depends on Power Control (DDPC).
- 4) TTY transmission is as expected on both links when TTY is OFF at the mobile, CER ≥ 3%.
- 5) No False Alarms found in > 30 hours of testing.
- 6) TTY terminals displayed some errors and variability in live testing.

LAB TESTING OF TTY/TDD - CDMA

Lucent Technologies
Bell Labs Innovations



Test Categories:

- 1) **Baseline Testing** - unimpaired TTY transmission performance for live & streaming uplink, downlink & mobile-to-mobile calls for both EVRC & 13K vocoders.
- 2) **HO Testing** - unimpaired TTY transmission performance for live & streaming, uplink, downlink & mobile-to-mobile calls for both EVRC & 13K vocoders under hand-off.
- 3) **Impairments Testing** - TTY transmission performance for live & streaming, uplink & downlink calls for both EVRC & 13K vocoders with Noise on RF link.
- 4) **TTY Interoperability Testing** - unimpaired TTY transmission performance for live & streaming, uplink & downlink calls for both EVRC & 13K vocoders with TTY OFF at mobile.
- 5) **False Alarm Testing** - unimpaired and impaired TTY transmission performance for streaming uplink & downlink calls for both EVRC & 13K vocoders.

Test Results: (Ultratec Compact TTY - Ameriphone Q90)

- 1) Downlink CER ~ 0%; Uplink CER ~ 0%; Streaming CER → 0%; Live CER → 0%;
- 2) Downlink CER ~ 0%; Uplink CER ~ 0%; Streaming CER → 0%; Live CER → 0%;
- 3) CERs with Noise same as for Baseline Tests up to FER ~ 30% on Uplink & ~ 20% on Downlink.
- 4) TTY transmission is as expected on both links when TTY is OFF at the mobile, CER is high .
- 5) No False Alarms found in ~ 60 hours of testing.
- 6) TTY terminals displayed some errors and variability in live testing.

TTY/TDD FOA - TDMA

Lucent Technologies
Bell Labs Innovations



Limited FOA (First Office Application) testing was done at 1900 MHz band frequencies only (TDMA) during May 2001.

Tests:

- Mobile to Landline Originations
- Landline to Mobile Terminations
- Mobile to Mobile Originations & Terminations
- Stationary & Drive Tests (including HOs)

Results:

- Uplink and downlink streaming tests passed for messages sent from the TTY/TDD terminal with no character errors.
- Downlink live tests passed for messages manually typed at the TTY/TDD terminal per the test plan with no character errors (error rate less than 1 in 1000 characters).
- Uplink errors were encountered when typing manually for the first one or two characters at the beginning of manual typing.
- HO errors were typically 2-3 characters; 1 TTY mode change.

TTY/TDD FOA - CDMA

Lucent Technologies
Bell Labs Innovations



FOA (First Office Application) testing planned for

Tests: (EVRC and 13K)

- Mobile to Landline Originations
- Landline to Mobile Terminations
- Mobile to Mobile Originations & Terminations
- Stationary and Drive Testing
- Voice Quality
- TTY Interoperability
- E-911

Results:

- Summary results of the tests will be provided to forum.

TTY/TDD Schedule & Milestones



TDMA Infrastructure:

- Limited FOA - late May, 2001
- Controlled Introduction - late June, 2001
- General Availability - August, 2001

CDMA Infrastructure:

- Ready for FOA - mid July, 2001
- General Availability - ≥ 30 days after FOA (customer permitting)

GSM Infrastructure:

- Delivery to AWS Labs - 31 October, 2001

TTY/TDD Mobiles:

- End-to-End VQ Lab Testing - In Progress
- Transition to Interoperability Lab - ~ August, 2001

Midwest Wireless Holdings L.L.C.
TTY Status Report
July 5, 2001

Midwest Wireless is a rural carrier that operates TDMA digital cellular service in its Minnesota, Iowa and Wisconsin markets. Due to the complexity of this issue, Midwest must rely on its switching vendor, Nortel Networks, to be 12/31/2001 software compliant in its MTX-10 software load, which is scheduled for general release during the fourth quarter of 2001.

Based on submissions to the TTY Forum provided by Nortel, and our primary handset providers, Nokia and Motorola, we believe Midwest Wireless will be capable of meeting the June 30, 2002 deployment deadline.

Respectfully submitted

Gary Christopherson
Director, External Relations & Regulatory
Midwest Wireless Holdings L.L.C.
507-385-2597

Motorola

Via Email

Dear Mr. Hall:

Motorola is pleased to submit a status report related to our efforts at attaining TTY compatibility with our digital phones and infrastructure. Motorola is a domestic supplier of cellular handsets in TDMA, CDMA, GSM, and iDEN technologies. We also provide infrastructure equipment in CDMA and iDEN technologies.

We are working closely with our carrier customers to provide them with the equipment necessary to meet the Federal Communications Commission's June 30, 2002 TTY deployment deadline. At this time, we are on track to enable these carriers to meet their obligations.

The attached report is provided to the TTY Forum for its report to the Commission for the second quarter of 2001. Please contact me at the number below if you have any questions.

Regards

Alfred R. Lucas
Vice President and Director
Office of Access Excellence
Motorola
Voice: 561-739-2505
TTY: 561-730-2506

MOTOROLA
TTY COMPATIBILITY DEVELOPMENT STATUS REPORT
2ND Quarter 2001

Product	Standard	Status	Milestones	Progress
CDMA Handset	IS 127-3 IS 733-2	System Test	IOT: June 2001 UI: August 2001 SA: 1Q 2002	Motorola infrastructure testing began March 2001.
GSM Handset	TS 26.226 TS 26.230 TR 26.231	Implementation	IOT: September 2001 UI: September 2001 SA: 1Q 2002	CTM implementation verified bit exact with the standard. Optimization and integration activities in progress. NOTE: proposed standard changes have an undetermined delay on delivery schedule.
iDEN Handset		System Test	On plan	CER tests are in progress
TDMA Handset	IS 823-A IS 840-A	Integration	IOT: July 2001 UI: August 2001 SA: 1Q 2002	Ballot version of IS-823-A implemented. Infrastructure tests to date have CER < 1%.
CDMA Infrastructure	IS 127-3 IS 733-2	Ready for FOA		Infrastructure software in field has digital TTY support available now. Only handsets are needed to commence testing.
iDEN Infrastructure		System Test ²	On plan	CER tests are in progress.

Note: Motorola works with its carrier customers to provide them specific information related to their respective products.

Note: IOT is Inter Op Testing with RAM based parts for Character Error Rate testing
 UI is User Interface testing with HCO / VCO support
 ROM is availability of ROM based phones. These should be functionally identical to a RAM phone.
 SA is Ship Acceptance of production volume quantities

Al Lucas
 Office of Access Excellence
 Motorola
 Phone: 561-739-2505
 TTY: 561-739-2506

² iDEN System Release 9.6 (SR9.6) System Test is in progress.

Nextel Communications, Inc.
2001 Edmund Halley Drive, Reston, VA 20191



July 5, 2001

Via Electronic Mail and Federal Express

Megan Hayes
The Alliance for Telecommunications Industry Solutions
1200 G Street, NW
Suite 500
Washington, D.C. 20005

Re: Nextel Communications, Inc. First Quarter 2001 Report to the TTY Forum

Dear Ms. Hayes:

Pursuant to the Fourth Report and Order of the Federal Communications Commission ("Commission") in CC Docket No. 94-102,³ Nextel Communications, Inc. ("Nextel") hereby submits this report on the status of its efforts to attain TTY accessibility on Nextel's iDEN handsets and network. Working closely with its vendor, Motorola, Inc. ("Motorola"), Nextel is pleased to report that its TTY accessibility progress is moving ahead in a timely manner. Pursuant to this schedule, Nextel intends to fulfill the Commission's June 30, 2002 TTY deployment deadline.

Nextel is a provider of digital Commercial Mobile Radio Services using Motorola's iDEN technology. Nextel is one of only three such iDEN providers in the United States. Thus, Nextel has worked with Motorola in the research and development of a TTY compatibility solution for the iDEN product and network. Since the Telecommunications Industry Association ("TIA") approved the Lucent solution for providing TTY accessibility on digital networks, Motorola has invested significant time and resources in creating a solution that will provide the same accessibility on iDEN networks.⁴ Specifically, Motorola has completed the requirements and design process, has implemented the TTY feature, and has begun lab testing of both the iDEN handset and iDEN network infrastructure.

With respect to handset deployment, Motorola has implemented the necessary changes in prototype handsets, and these currently are being tested in Motorola's labs. Once Motorola's testing is completed, and no significant set backs occur, Nextel can conduct "beta testing" of the handsets in its lab. Nextel's lab testing is currently scheduled for July-August 2001. Thereafter, Nextel will conduct a "beta test" of the TTY-

³ *In the Matter of Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Calling Systems*, Fourth Report and Order, CC Docket No. 94-102, FCC 00-436, released December 14, 2000 ("Fourth R&O").

⁴ See, e.g., Fourth R&O at para. 3.

upgraded handset and the upgraded iDEN infrastructure in a single Nextel market. This field test currently is scheduled for late Third Quarter/Early Fourth Quarter 2001.

The iDEN infrastructure process also is on schedule for full deployment by June 2002. As with the handset, the requirements and design process is complete and testing in Motorola's labs is underway to permit the planned Third Quarter/Fourth Quarter 2001 field test noted above. Nextel plans to test its TTY-capable handsets and infrastructure with both the TTY community and Public Safety Answering Points. Assuming no significant setbacks in the field trial, Nextel and Motorola currently anticipate product delivery of the TTY infrastructure in Fourth Quarter 2001.

At that time, Nextel can initiate full deployment of the TTY upgrades throughout its nationwide network. As Nextel has previously explained, these modifications will impact the process for encoding the voice channel on iDEN's system. Because such vocoder modifications have the potential to impact voice quality for all Nextel users, these base station controller modifications will require considerable time and attention. At this time, Nextel anticipates completing deployment by the Commission's June 30, 2002 deadline.

Nextel appreciates the opportunity to provide this report to the TTY Forum as part of the forum's quarterly TTY report to the Commission. If you have any questions about this report, please do not hesitate to contact me at 703-433-8315.

Sincerely,

Robert D. Montgomery
Senior Manager – Regulatory Technology Development

Nortel Networks

June 26, 2001

CDMA TTY/TDD Regulatory FAQ/RFI

Enclosed is information regarding Nortel Networks' plans to comply with FCC's TTY requirements.

- Is the TTY/TDD part of the E911 phase II program?

Nortel response: No, it is not. The TTY/TDD feature is a separate wireless feature than that of E911 Phase 2. "TTY/TDD" refers to a Teletypewriter /Terminal for Deaf Device, which is a specialized character based device that allows a Hearing or Speech Impaired person to communicate when this TTY device is connected to a TTY capable CDMA mobile handset to communicate in a Wireless network. TTY/TDD mobile phones do need to work with E911 services; they are independent features. The E911 Phase 2 functionality provides greater accuracy in determining the location of the mobile subscriber making a 911 emergency services call than that of the MTX08 E911 Phase 1 feature.

- What is the status of TTY/TDD network infrastructure software/hardware development and testing?

Nortel response: Nortel Networks' development and product test is based on current standards: IS-127-2 (EVRC) & IS 733-1(13K Vocoder). New revisions of these standards will be published later this year as IS-127-3 (EVRC TTY) & IS-733-2 (13K TTY). Nortel Networks has completed testing using Qualcomm prototypes, which have shown positive results. Nortel Networks does not anticipate performance issues with any other vendor's handsets once they come available.

Nortel Networks plans to support new and evolved standards in next year's software releases, but it will not be possible to include any new changes in this year's release, i.e. NBSS10.1. Operators will be able to deploy the Nortel Networks TTY solution based on the current standards IS-733-1, IS127-2 to meet the FCC deadline for implementation.

- What is Nortel Network's TTY/TDD plans to test and confirm solution performance including additional tests referenced in Sections 20-23 of the FCC 4th Rule and Order 12-14-2000?

Nortel response: Regarding Section 20-23, TurboCode and HiSpeed is each a proprietary feature of TTY device vendors Ultratec and Ameriphone, respectively. Due to the code being proprietary Nortel Networks will not test or support these enhanced solutions. Standards are designed to avoid supporting proprietary methods, and Nortel Networks is not aware of any effort to standardize these proprietary features.

- What are the hardware baseline and software baseline to support CDMA TTY/TDD functionality?

Nortel response:

Regulatory solution required	CDMA HW/SW baseline
TTY/TDD	MTX09 SW for the DMS-MTX NBSS10.1 SW for the BSC and/or BTS TTY capable handsets (3 rd party)

June 26, 2001

CDMA TTY/TDD Regulatory FAQ/RFI

- What software baseline must the MTX be running in order to upgrade to MTX10 and/or NBSS10.1?

Nortel response: The MTX is required to be running MTX09 in order to upgrade to NBSS10.1 or to upgrade to MTX10. The MTX operating system has received significant changes due to moving to a multi-processing architecture. It is because of these OS changes that an MTX cannot upgrade safely from MTX08 directly to MTX10.

- What is the Network infrastructure software/hardware planned general availability dates that support the deployment of this regulatory feature?

Nortel response: In order to comply with the FCC's December 31, 2001 requirement for TTY/TDD, Nortel Networks commits to delivering the enabling software as follows:

Software load	CDMA SW general availability
MTX09	Today
NBSS10.1 with MTX09	October 5, 2001
MTX10 CDMA	December 7, 2001

- How is the software/hardware for TTY/TTD subscribers provisioned in the network?

Nortel response: The provisioning for TTY must be done the same way as for the voice subscribers.

- What is the schedule for deployment of the software/hardware in the network?

Nortel response: The minimum baseline software requirements for this functionality are given above. For questions related to scheduling its deployment into a carrier's network, please contact Nortel Networks Product Deployment.

- For TTY/TDD what are the plans to work with any wireless carrier to perform end-to-end customer tests, and when will this occur?

Nortel response (for verification or lead customers): The verification process for NBSS 10.1 and MTX10 with the customer is expected to start in July 2001. Nortel recommends that the operator engage their chosen CDMA TTY handset vendor during the verification process or VO process to do interoperability testing with the Nortel Networks solution.

Nortel response (for NON verification or lead customers): Nortel Networks will be validating the CDMA TTY feature with customers in a few markets through the Verification Office process for NBSS 10.1 subject to availability of handsets from those operators. This activity is expected to start in July 2001. Also refer to the above response, which encourages customers to schedule TTY testing in the Nortel Networks Wireless Interoperability Lab.

All activities depend heavily on the availability of new TTY/TTD handsets.

- What are Nortel Network's plans to test their own or other vendor handsets with your switch solution?

Nortel response: Nortel Networks provides only infrastructure for wireless networks. Nortel Networks does not provide mobile handsets. Even though the infrastructure software is scheduled in advance of the Dec 31, 2001 FCC requirement, commercial handset general availability dates have not been scheduled by handset vendors. Nortel Networks recommends that the operator engage its handset vendor(s) in order to respond to the FCC regarding handset availability.

June 26, 2001

CDMA TTY/TDD Regulatory FAQ/RFI

Nortel Networks understands that it is most challenging for handset and infrastructure manufacturers to design CDMA TTY/911 solutions and have solution commercially available by the FCC December 31, 2001 date. This difficult task is exacerbated with revisions to the standards. Nortel Networks believes that for CDMA solutions, the standard and any improvements should be immediately locked down in order for all vendors to design to a common standard and common code set. In order to meet the FCC deadline Nortel Networks will not be in a position to incorporate into the NBSS10.1 release any revisions to the CDMA standards.

Operators are encouraged to request their handset vendors to test their commercial CDMA TTY capable handsets in Nortel's Wireless Interoperability Lab.

Please contact Cher Bruce for scheduling TTY testing in the Nortel Networks Wireless Interoperability Lab, where testing is based on current published standards (Phone: 972-684-2299; Fax: 972-684-3881; csbruce@nortelnetworks.com)

- **Contacts:**

Product Marketing	MTX10/NBSS10.1 SW	Kurt Raaflaub	972-685-2971
Product Management	CDMA TTY/TDD	Maniam P	972-685-7203
Regulatory	E911Ph2&TTY/TDD	Charles Spann	972-684-1723
Product Deployment	CDMA NBSS SW	Mark Schwarzer	972-685-5851

June 26, 2001

TDMA TTY/TDD Regulatory FAQ/RFI

Enclosed is information regarding Nortel Networks' plans to comply with the FCC's TTY requirements.

- Is the TTY/TDD part of the E911 phase II program?

Nortel response: No, it is not. The TTY/TDD feature is a separate wireless feature than that of E911 Phase 2. "TTY/TDD" refers to a Teletypewriter /Terminal for Deaf Device, which is a specialized character based device that allows a Hearing or Speech Impaired person to communicate when this TTY device is connected to a TTY capable TDMA mobile handset to communicate in a Wireless network. TTY/TDD mobile phones do need to work with E911 services; they are independent features. The E911 Phase 2 functionality provides greater accuracy in determining the location of the mobile subscriber making a 911 emergency services call than that of the MTX08 E911 Phase 1 feature.

- What is the status of TTY/TDD network infrastructure software/hardware development and testing?

Nortel response: Nortel Networks' TDMA TTY/TDD functionality is compliant to IS-823 (TTY/TDD Extension to TIA/EIA 136-410 Enhanced Full Rate Speech Codec) for the EFRC Codec. The development and product testing are complete and system verification is being performed. Nortel Networks has tested this feature using only alpha/beta handsets from Panasonic and Motorola, which have both shown positive results. We anticipate receiving prototype handsets from other vendors shortly and will conduct testing with those handsets.

Nortel Networks plans to support new and evolved standards in next year's software releases. Operators will be able to deploy the Nortel Networks TTY solution i.e. MTX10, which is based on the current IS-823A standard, to meet the FCC deadline for implementation pending the availability of the stable test handsets from at least two vendors. At this point the TTY feature in MTX10 is being termed a "prep" feature due to the unavailability of commercial grade handsets.

- What is Nortel Network's TTY/TDD plans to test and confirm solution performance including additional tests referenced in Sections 20-23 of the FCC 4th Rule and Order 12-14-2000?

Nortel response: Regarding Section 20-23, TurboCode and HiSpeed is each a proprietary feature of TTY device vendors Ultratec and Ameriphone, respectively. If TDMA standards are enhanced to support these devices, Nortel will support this in a future release. Standards are designed to avoid supporting proprietary methods, and Nortel Networks is not aware of any effort to standardize these proprietary features.

- What are the hardware baseline and software baseline to support TDMA TTY/TDD functionality?

Nortel response:

Regulatory solution required	TDMA HW/SW baseline
TTY/TDD	EDSPM SW for the ICP; MTX10 SW for the DMS-MTX TTY capable handsets (3 rd party)

- What software baseline must the MTX be running in order to upgrade to MTX10?

Nortel response: The MTX is required to be running MTX09 in order to upgrade to MTX10. The MTX operating system has received significant changes due to moving to a multi-processing architecture. It is because of these OS changes that an MTX cannot upgrade safely from MTX08 directly to MTX10.

- What is the Network infrastructure software/hardware planned general availability dates that support the deployment of this regulatory feature?

Nortel response: In order to comply with the FCC's December 31, 2001 requirement for TTY/TDD, Nortel Networks commits to delivering the enabling software as follows:

Software load	TDMA SW general availability
MTX09	Today
MTX10 TDMA	November 30, 2001

- How is the software/hardware for TTY/TTD subscribers provisioned in the network?

Nortel response: The provisioning for TTY must be done the same way as for the voice subscribers.

- What is the schedule for deployment of the software/hardware in the network?

Nortel response: The minimum baseline software requirements for this functionality are given above. For questions related to scheduling its deployment into a carrier's network, please contact Nortel Networks Product Deployment.

- For TTY/TDD what are the plans to work with any wireless carrier to perform end-to-end customer tests, and when will this occur?

Nortel response (for verification or lead customers): The verification process for MTX10 with the customer is expected to start in July 2001. Nortel recommends that the operator engage their chosen TDMA TTY handset vendor during the verification process or VO process to do interoperability testing with the Nortel Networks solution.

Nortel response (for NON verification or lead customers): Nortel Networks will be validating the CDMA TTY feature with customers in a few markets through the Verification Office process for MTX10 subject to availability of handsets from those operators. This activity is expected to start in July 2001. Also refer to the above response, which encourages customers to schedule TTY testing in the Nortel Networks Wireless Interoperability Lab.

All activities depend heavily on the availability of new TTY/TTD handsets.

- What are Nortel Network's plans to test their own or other vendor handsets with your switch solution?

Nortel response: Nortel Networks provides only infrastructure for wireless networks. Nortel Networks does not provide mobile handsets. Even though the infrastructure software is scheduled in advance of the Dec 31, 2001 FCC requirement, commercial handset general availability dates have not been scheduled by handset vendors. Nortel Networks recommends that the operator engage its handset vendor(s) in order to respond to the FCC regarding handset availability.

June 26, 2001

TDMA TTY/TDD Regulatory FAQ/RFI

Nortel Networks understands that it is most challenging for handset and infrastructure manufacturers to design TDMA TTY/911 solutions and have solution commercially available by the FCC December 31, 2001 date. This difficult task is exacerbated with revisions to the standards. Nortel Networks believes that for TDMA solutions, the standard and any improvements should be immediately locked down in order for all vendors to design to a common standard and common code set. In order to meet the FCC deadline Nortel Networks will not be in a position to incorporate into the MTX10 release any revisions to the TDMA standards.

Operators are encouraged to request their handset vendors to test their commercial CDMA TTY capable handsets in Nortel's Wireless Interoperability Lab.

Please contact Cher Bruce for scheduling TTY testing in the Nortel Networks Wireless Interoperability Lab, where testing is based on current published standards (Phone: 972-684-2299; Fax: 972-684-3881; csbruce@nortelnetworks.com)

- **Contacts:**

Product Marketing	MTX10 SW	Kurt Raflaub	972-685-2971
Product Management	TDMA TTY/TDD	Syed Zaidi	972-684-0403
Regulatory	E911Ph2&TTY/TDD	Charles Spann	972-684-1723
Product Deployment	TDMA MTX SW	Shawn Moffat	972-684-4293

Background:

The TTY/911 GSM solution uses a new modem called a Cellular Text Telephone Modem (CTM). If the CTM is used over the air interface then somewhere in the cellular network transcoding is required to one of the V.18 text telephone standards to ensure interwork with existing text telephone equipment. In the United States transcoding between the CTM and Baudot is used. At the Dusseldorf 3GPP GTT/TTY meeting an enhanced "CTM Circuit Pooling Solution" was presented as a method of providing a common point of interworking for multi-vendor networks. A "fast track" focus on this solution resulted in agreement by all ATIS TTSI carrier and manufacturer participants at the June 2001 meeting to utilize the Circuit Pooling Solution. The Circuit Pooling Solution will necessitate some standards development; most critical of which is the assignment of an existing, but spare, codepoint, which the terminal must send to the network to indicate CTM, transcoding is required. There is also a requirement for the MSC switch to detect the new code point and allocate an A-interface circuit where CTM/TTY conversion capabilities will be present.

Standards & FCC Requirement

The base line standards for GSM are 3GPP

The FCC deadline is for carriers to acquire solution hardware and software by December 31, 2001, and to offer service by June 30, 2002.

The FCC requires carriers to file quarterly status reports regarding the carrier's implementation status to support TTY/911 calls over their digital systems. While carriers can directly file reports with the FCC, the FCC rules ("Fourth R & O") permit carriers to report through the organization ATIS. The next quarterly report is due July 16, 2001.

Nortel Network Solution Set

Hardware requirement – Upgrade to BSCe3 and TCUE3

Software – BSS release v13.1 or greater

A TTY/911 solution will be developed for the TCU2G, but will not be available until March-May 2002.

Development and Testing

Lab testing has not identified problems – in house testing with handsets has not occurred due to lack of available test handsets.

Product Time Line

BSCe3 & TCUE3 g2 week 41, GA 4Q 2001

BSS V13.1 g2 week 41, GA 4Q 2001

TCU2G March-May 2002

Issues and Concerns

- While some standards development is needed for the Circuit Pooling Solution, we hope manufacturers have sufficient common understanding of the solution that equipment will be generally available to provide TTY/911 service by June 2002.
- The ATIS Forums, and ATIS TTSI incubator sessions have facilitated a faster track of information sharing between manufacturers, and convergence on solutions. However, the large number of problems being detected in more complete testing (mostly with non-GSM systems, but some problems may apply to GSM systems) suggest that some TTY users may have problems with their equipment, or have problems with calls going across some types of network equipment
- The wireless industry will not know the full scope of the solution workability or possible user problems until there can be live air end-to-end (from TTY User to the PSAP) across different networks and network configurations. As most industry equipment is still in development it is not possible to project with certainty that stable acceptable TTY/911 solutions will be operational in all networks by June 2002
- Handset manufacturers have not given firm dates for test handsets or consumer GA, especially for handsets using the spare codepoint for the Circuit Pooling Solution
- There must be some method to connect the handset to the TTY, and it is unclear when equipment will be available. It is now apparent that some unshielded connection cords supplied for TTY/911 testing will cause message errors
- Industry solutions only support Baudette 45.5 TTY transmissions, propriety TTY transmissions, and European Baudot 50 are not supported.

RESPONSE TO GSM CUSTOMER

July 11, 2001

Dear GSM Customer

Enclosed is information regarding Nortel Networks' plans to comply with FCC TTY requirements, in response to raised questions.

- network infrastructure software/hardware development and testing
Nortel response: Nortel Networks' development is in progress; lab simulation testing has been completed. Nortel has not been able to test with TTY/911 enabled GSM handsets/CTM modules, as none has been available.
- network infrastructure software/hardware planned general availability date
Nortel response: In order to comply with the FCC's December 31, 2001 requirement for TTY/TDD, Nortel will be committing to have G2 BSCe3 and TCUE3 hardware by week 41, with GA in 4Q, 2001, the TTY software patch, V13.1 will be available within the time frame as for the BSCe3 & the TCUE3.

In addition Nortel Networks will have a TTY/911 solution for TCU2G equipment in the March to May 2002 time frame (controlled introduction ramp).

- schedule for deployment of the software/hardware in the Wireless switches
Nortel response: Deployment times may vary depending upon the network configuration, how much deployment work is to be done by Nortel Networks and how much by the customer, and how many customers want common deployment times.
- Nortel Network plans to test and confirm solution performance including additional tests referenced in Sections 20-23 of the order during the six-month extension allowed for this purpose in the order, January 1 through June 30, 2002.
Nortel response: Regarding Section 20-23
TurboCode/ HiSpeed is a proprietary feature on Ultratec/Ameriphone TTY device and is not supported by GSM standards. If GSM standards are enhanced to support the propriety codes, then Nortel will support this in a future release. However, Nortel Networks does not foresee support for the current propriety codes unless they become open and standardized.

Background: At the TTY Forum #16, Ultratec identified a unique problem their equipment users may have had calling 911 using their advanced proprietary protocol. Ameriphone also uses an advanced proprietary protocol. While the FCC directive and the Mission of the TTY Forum was only to provide a solution for a Baudot message to 911, a committee from Forum #16 was formed to explore the feasibility of solutions for proprietary systems.

At the TTY Forum #17, March 14, 2001, the committee reported that

- ◆ Proprietary protocol manufacturers would advise their customers how to avoid problems with a digital wireless TTY/911 call,
- ◆ Solution development should continue focus on providing solutions for Baudot TTY messages, and
- ◆ The Committee be dissolved.

The proposals were adopted at the TTY Forum #17.

- plans to test your own or other vendor GSM TTY Subscriber equipment with your transcoder solution.
Nortel response: Nortel Networks will test with other vendor's equipment, which meets T1.718 and T1.719 standards. Major subscriber equipment vendors have been contacted regarding the availability of both test samples and production units.
Nortel Networks recommends (*Customer's Name*) engage its handset vendors for a thorough response to the FCC.

Nortel Networks understands that it is most challenging for handset manufacturers to design GSM TTY/911 solutions into handsets and CTM Modules and have commercial availability by the FCC December 31, 2001 date, especially with the codepoint feature. Nortel Networks is not surprised that, despite diligent work, firm handset availability dates were not generally available at the TTY #18 Forum. Nortel Networks believes that for GSM solutions, except for the minor standards work needed for the CTM Circuit Pooling Solution, any new standards or improvements should be locked down in order for all vendors to design to a common standard and common code set.

- plans to work with any wireless carrier to perform end to end customer tests
Nortel response: A Field Test program is currently under definition.
- plans to test with the Public Safety Community (PSAP's)."
Nortel response: Nortel recommends (*Customer's Name*) should schedule this testing with the PSAP centers during its solution testing. Nortel Networks will work with (*Customer's Name*) to identify PSAPs that would be willing to test an end-to-end solution. Additionally, it is recommended that 711 functionality be tested with Telecommunications Relay Service Centers (TRS's); the 711 service is also mandated by the FCC.

Additional concerns:

Beyond the questions already responded to, we would like to address the problem issues raised at the TTY Forum #17 & #18, and at recent ATIS TTSI incubator meetings. While Nortel Networks lab testing to date has not identified an echo canceller problem with Nortel Networks' equipment and software there may be problems for some end-to-end (TTY user to PSAP) calls that may vary according to the type of consumer equipment used, and configuration of the wireless/wireline network used for the call. Nortel Networks is an active participant in ATIS Forum, and ATIS TTSI meetings where problem identification and sharing is on a "fast track". Nortel Networks is aware of problems identified, where the echo canceller/echo suppressor in the call loop has created a problem with TDMA TTY/911 solutions, and the problem may extend to GSM systems. Nortel Networks will continue to carefully review further results for any echo canceller problem in future testing, but we do not anticipate a problem with our solution at this time.

Nortel Networks has designed its TTY/911 solution to existing standards using the transcoders to provide TTY/911 communication. Nortel Networks was an active participant in developing the CTM Circuit Pooling Solution that will provide interworking for multi-vendor networks, and make possible TTY/911 calling for users roaming in different GSM networks, and is designing its solutions to support the CTM Circuit Pooling Solution. All Carriers and Manufacturers participating in the June 2001 ATIS TTSI meeting agreed to support the CTM Circuit Pooling Solution, and Nortel Networks is not aware of any key GSM equipment manufacturer that will not be supporting the solution.

Nortel Networks wishes to RED FLAG the availability of handsets and the compliancy with Codepoint CTM Circuit Pooling Solution. At this time Nortel Networks has been given tentative handset availability dates beyond the required timeframe of week 30, 2001. More importantly, Nortel has not been given availability dates for handsets complying with the Code Point CTM Circuit Pooling Solution. The CTM Circuit Pooling Solution will only work if handsets are enabled to invoke the Codepoint CTM Circuit Pooling Solution. Because handset manufacturers have not conveyed when CTM Circuit Pooling Solution GSM handsets will be available for testing network solutions, or for consumer GA, Nortel Networks cannot commit to when carriers can have a working TTY/911 solution for GSM systems.

In conclusion, please note that the TTY Forum #18 Draft Report is available, as well as TTSI problem summaries. These reports include information summarizing activities and identified problems shared within the industry to "fast track" TTY/911 solutions across all wireless technologies. Should you require access to these reports, please contact ATIS (Alliance for Telecommunications Industry Solutions) via Ed Hall (202) 628-6380 or Megan Hayes (202) 662 8653, or your Nortel Networks account representative.

Regards,

Nortel Networks

D&E / Omnipoint Wireless Joint Venture, LP
d/b/a PCS One
TTY Progress Report
July 9, 2001

Background

PCS One is a wireless service provider located in south central Pennsylvania. The company is a 50/50 partnership between D&E Wireless and Omnipoint (now VoiceStream).

The technical standard used is GSM. Our infrastructure manufacturer is Nortel and we currently sell handsets made by Ericsson, Motorola and Nokia.

Progress Report

Nortel has informed us that they are expecting to have the necessary software upgrade available in the first quarter of 2002.

We are waiting to hear from our handset manufacturers regarding when handsets will be available for testing and available for consumers.

When we have firm commitment dates from our manufacturers we will begin scheduling testing with any PSAPs that wish to do so.

We will work with VoiceStream to do everything in our power to meet the mandated deadlines.

Pine Belt Cellular, Inc.
3984 County Road 32
P. O. Box 279
Arlington, Alabama 36722

TTY Report – July 10, 2001

Pine Belt Cellular, Inc. is completely reliant upon its vendors to implement the TTY solutions in its handsets and network. Pine Belt does not have the ability to independently verify the release dates of the solutions that will be provided by the vendors.

1.) Network infrastructure software development:

Lucent Technologies, our switch and infrastructure manufacturer is aware of the TTY requirements. Our understanding is that Lucent is currently working on software solutions at this time. Pine Belt is dependent upon Lucent providing these solutions.

2) Handset development and testing plans:

Pine Belt Cellular uses handsets made by a number of manufacturers. The manufacturers most predominantly used by Pine Belt are Motorola, Nokia, and Kyrocera. Pine Belt will stay abreast of the developments by these manufacturers so when TTY solutions are made available, we will be able to provide these units to our customers as soon as possible.

3) Beta testing and lab testing:

Pine Belt Cellular will begin testing TTY compatible equipment as soon as both our handset and infrastructure manufacturers provide solutions to us.

4) Release and general availability to carriers of network infrastructure software

Pine Belt Cellular is awaiting updated reports of software availability from switching and infrastructure vendors.

5) Availability to carriers of full acceptance test units:

Pine Belt Cellular is awaiting software and hardware availability from switching, infrastructure, and handset vendors.

6) Efforts toward achieving digital wireless solution compatibility with enhanced TTY devices:

Pine Belt Cellular remains dependent upon the availability of vendor provided solutions to meet the FCC's tentatively mandated timeline (12-31-01) to provide E911 TTY access to our networks.

7) Carrier coordination of testing with PSAP:

This testing target date is dependent upon solutions provided by network infrastructure vendors and handset vendors.

8) Carrier testing activities, including field testing, consumer end-to-end testing, and other necessary tests:

Testing will begin immediately upon receipt of software and hardware. Pine Belt Cellular is dependent upon network infrastructure vendor solutions.

9) Retail availability of necessary consumer equipment:

Pine Belt Cellular is dependent upon the availability of handsets from vendors. No firm commitment has been received at this time from handset vendors.

10) Geographic scope of network infrastructure deployment:

Pine Belt Cellular service area: Alabama RSA3B2 & BTA415

SpectraCom, Inc.
d.b.a PYXIS Communications
TTY Report
Monday, July 09, 2001

PYXIS Communications uses CDMA technology to provide digital wireless service in all of our markets. PYXIS Communications is completely reliant upon its vendors to implement the TTY solution in its handsets and network.

Infrastructure Vendor Status

Nortel is PYXIS' infrastructure provider. We did not receive an updated response from Nortel in time to make this filing. Their response from our previous filing in April 2001 was as follows:

Nortel Network Solution Set

The Nortel Network software solution is in release MTX-10, scheduled for general availability week 44, 2001.

Development and Testing

Lab testing has not identified problems – in house testing has been done with one handset. Lack of availability of CDMA test handsets prevented testing of a wider range of subscriber apparatus.

Product Time Line

MTX-10, scheduled for general availability week 44, 2001, supporting code for the IS-127-2 & IS-733-1 standards, and at least one function of the code relating to the future IS-127-3 & IS-733-2 standards.

Issues and Concerns

- The changes to CDMA TTY/911 code, and the coming standard change has created much difficulty to design solutions to a “moving target”.
- The FCC's date for carriers to acquire TTY/911 equipment is December 31, 2001; a standard change is expected in April 2001. There is not sufficient time between April and December to fully evaluate all changes, and incorporate all proposed changes in software that customers will have in December
- Some proposed changes are more important than others. Manufacturers can incorporate important changes without incorporating all. It is not known how different equipment using different mixes of equipment will interoperate
- Nortel Networks believes standards must be “locked down” for equipment developers to design to a common target for initial equipment deployment. Future changes in initial equipment standards should provide time developing a stable and fixed second round design target
- Industry solutions only support Baudette 45.5 TTY transmissions, propriety TTY transmissions, and European Baudot 50 is not supported.
- Ericsson has filed a Report Number 47 with ATIS that identifies a test failure where the Voice Recognition function is incompatible with the existing TTY

Detector. It is not clear if the recent Lucent code change will cure this problem, or if the problem applies to Nortel Network equipment and software.

Handset Vendor Status

Kyocera asked us to use the same information that we filed in our previous filing in April 2001. Their previous response is as follows:

KYOCERA Response:

Kyocera Wireless Corporation (KWC) is in the process of developing the TTY feature. KWC is planning to have completed the development in order for this feature to become available on commercial handset offerings in 1H2002 to meet the implementation deadline established by the FCC.

In order to meet the deadline KWC is planning to develop TTY feature support in an existing, approved, handset platform that can be used for testing. In that regard the feature can be tested and modified as necessary using a process external to our commercial product development schedules and processes.

At this time some preliminary development has commenced, but has been limited to producing feature support in the User Interface of our handsets. With respect to standards, we are also coordinating and tracking the development of the latest code changes being implemented in Qualcomm ASICs. Our understanding is these changes support Lucent's recommendations (changes to the IS-733-1 and IS-127-2 standards) proposed at the end of last year.

We have also been coordinating with the infrastructure manufacturers Lucent Technologies, Nortel-networks, and Motorola CIG with respect to their schedules and plans for feature completeness of their infrastructure. These tests will be coordinated with infra-development labs, Interoperability labs, or carrier network, depending upon availability and timing. From our communications with the infrastructure manufacturers, our understanding is that by 4Qtr2001 carriers should also have the ability to test this feature in their network. It is our intention to have the feature development process matured to the extent it could be tested on a network in that time frame.

In support of the testing we are planning, KWC has procured TTY devices manufactured by Ultratec and Ameriphone. Our understanding is these are the most widely utilized devices in the industry therefore it is our intention to limit end to end customer testing to these devices.

Motorola response:

No update/response has been received from Motorola.